

**U.S. DEPARTMENT OF AGRICULTURE  
FOREST SERVICE**

**SPECIFICATION**

**SHIRT, FLAME-RESISTANT ARAMID**

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers the requirements for flame-resistant shirts.

1.2 Classification. The shirt shall be of one type in the following sizes (see 6.2):

<u>Nominal size</u>	Dimensions (inches)	
	<u>Neck size</u>	<u>Sleeve length</u>
Extra Small (XS)	13-1/2	31
Small (S)	14-1/2	32
Small-Long (SL)	14-1/2	33
Medium (M)	15-1/2	33
Medium-Long (ML)	15-1/2	34
Large (L)	16-1/2	34
Large-Long (L-L)	16-1/2	36
Extra Large (XL)	17-1/2	35
Extra Large-Long (XL-L)	17-1/2	36
Extra Extra Large (2XL)	18-1/2	36
Extra Extra Large-Long (2XL-L)	18-1/2	37
Extra Extra Extra Large (3XL)	19-1/2	37
Extra Extra Extra Large Long (3XL-L)	19-1/2	38
Extra Extra Extra Extra Large (4XL)	20-1/2	38
Extra Extra Extra Extra Large Long (4XL-L)	20-1/2	39

Beneficial comments (recommendations, additions, deletions) and any pertinent data that may be used in improving this document should be addressed to: USDA Forest Service, Missoula Technology and Development Center, 5785 Highway 10 West, Missoula, MT 59808, by using the Specification Comment Sheet at the end of this document or by letter.

## 2. APPLICABLE DOCUMENTS

### 2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals (see 6.2).

### SPECIFICATIONS

#### FEDERAL

A-A-50198 - Thread, Gimp, Cotton, Buttonhole  
A-A-55126 - Fastener Tapes, Hook and Pile, Synthetic  
A-A-55217 - Thread, Aramid, Spun Staple  
V-B-871 - Button, Sewing Hole, and Button, Staple, (Plastic)

#### MILITARY

MIL-DTL-32075 - Label: For Clothing, Equipage, and Tentage (General Use)

#### USDA FOREST SERVICE

5100-87 - Cloth, Shirting, Aramid

### STANDARDS

#### FEDERAL

FED-STD-123 - Marking for Shipment (Civil Agencies)  
FED-STD-376 - Preferred Metric Units for Use By the Federal Government

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Department of Defense Single Stock Point (DODSSP), Building 4/Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094. Forest Service specifications are available from USDA Forest Service Missoula Technology Development Center, 5785 Highway 10 West, Missoula, MT 59808.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those in effect on the date of the invitation for bids or request for proposals (see 6.2).

DRAWINGS

USDA FOREST SERVICE

MTDC-960 - Patterns, Shirt, Flame-Resistant, Aramid, M-1998

(Address requests for copies to USDA Forest Service, Missoula Technology and Development Center, 5785 Highway 10 West, Missoula, MT 59808.)

2.2 Non-Government publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals (see 6.2).

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

Photographic Comparative Rating of Single and Double Needle Seams  
(Method 88B, two photos)

(Address requests for copies to the American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709.)

AMERICAN SOCIETY FOR QUALITY (ASQ)

Z1.4 - Sampling Procedures and Tables for Inspection by Attributes

(Copies are available from the American Society for Quality, PO Box 3005, Milwaukee, WI 53201-3005.)

ASTM

D 1974 - Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Shipping Containers

D 3951 - Standard Practice for Commercial Packaging

D 5118 - Standard Practice for Fabrication of Fiberboard Shipping Boxes

D 6193 - Standard Practice for Stitches and Seams

(Copies are available from ASTM International, 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959.)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

1977 - Protective Clothing and Equipment for Wildland Fire Fighting, 2005 Edition

(Address requests for copies to National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

(Address requests for copies to the American Trucking Association, Inc., Traffic Department, 1616 P St. NW, Washington, DC 20036.)

SEARS, ROEBUCK AND COMPANY

Sears Fabric Defect Replica Scales

(Address requests for copies to the Sears, Roebuck and Co., "Fabric Defect Replica Kit," Department 817 (ATTN: FC 554B), 3333 Beverly Rd., Hoffman Estates, IL 60179.)

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classification

(Address requests for copies to Uniform Freight Classification Committee, Room 1106, 222 S. Riverside Plaza, Chicago, IL 60606.)

(Non-Government standards and other publications normally are available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 First article. Unless otherwise specified (see 6.2), the item shall be subjected to first article inspection (see 6.3) in accordance with 4.3. During the term of the contract the contractor shall be required to notify the contracting officer in writing when a component, or the component supplier, changes in any way; when a major manufacturing process changes in any way; and when a manufacturing location changes. The contracting officer may at any time require the contractor to submit a new first article sample when substantive changes occur during the term of the contract.

3.1.1 NFPA 1977. The shirts shall be third party certified as being in compliance with National Fire Protection Association (NFPA) Standard 1977, Protective Clothing and Equipment for Wildland Fire Fighting. Proof of this certification shall be presented at the time of First Article submission.

3.2 Materials and components. Materials and components shall be as specified herein and in the applicable drawing, MTDC-960. In addition, the materials and components shall comply with NFPA 1977.

3.2.1 Basic material. The basic material shall be in accordance with the requirements specified in Forest Service specification 5100-87, the fabric shall have a soft hand.

3.2.2 Collar interlining. It shall be optional to the contractor to use any of the three materials specified below for the collar interlining.

3.2.2.1 Basic material. The collar interlining shall be basic material (see 3.2.1).

3.2.2.2 Aramid blend. The collar interliner shall be a blend of 95 percent meta-aramid and 5 percent para-aramid. The interlining shall be 4.2 to 6.3 ounces per square yard plain weave. The color shall be natural or yellow. The interlining shall conform to textile fabric requirements specified in NFPA 1977 for protective clothing. The number of fabric nonconformities shall not exceed 200 points per hundred yards when tested in accordance with yard-by-yard inspection for basic material (see 3.2.1).

3.2.2.3 Nonwoven aramid. The collar interliner shall be meta-aramid weighing 1.0 to 1.6 ounces per square yard.

3.2.3 Thread. The aramid thread shall conform to Type I, Tex size 35 and Tex size 59, or Type II, Tex size 27 and Tex size 45, A-A-55217. Thread color shall be a good approximation of the basic material (see 3.2.1).

3.2.4 Gimp. The cotton gimp for reinforcing buttonholes shall conform to type I or II, Ticket No. 8 of A-A-50198. The color shall be a good approximation of the basic material (see 3.2.1).

3.2.5 Buttons. The buttons shall conform to type II, class D, style 26, size 30-line of V-B-871. The color shall be a good approximation of the color of the basic material (see 3.2.1) and shall have a glossy finish.

3.2.6 Fastener tape, hook and pile. The hook and pile fastener tape shall conform to 1 inch width, type II, class 1 of A-A-55126. The color of the tape shall be a good approximation of the color of the basic material (see 3.2.1).

3.2.7 Labels. Each shirt shall have two sewn-on labels: a combination identification/instruction/care label and a woven size label.

3.2.7.1 Combination label. The combination identification/care label shall meet the product labeling requirements of NFPA 1977-2005 for laundering and dry cleaning. The label shall include the following warning and information printed in letters at least 1/16th inch in height:

THIS WILDLAND FIRE FIGHTING PROTECTIVE GARMENT MEETS THE GARMENT REQUIREMENTS OF NFPA 1977, STANDARD ON PROTECTIVE CLOTHING AND EQUIPMENT FOR WILDLAND FIRE FIGHTING, 2005 EDITION.

SHIRTS, FLAME-RESISTANT ARAMID

[Manufacturer's name] (1/)

[Manufacturer's address] (1/)

[Country of origin] (1/)

[Manufacturer's garment identification number, lot number, or serial number] (1/)

DATE OF MANUFACTURE: [mm/yy] (1/)

USDA FOREST SERVICE SPECIFICATION 5100-91G

SIZE: [ ] (1/)

CONTRACT NUMBER: [ ] (1/)

NSN: [ ] (1/)

MATERIALS CONTENT: 98% ARAMID, 2% CARBON CORE

[Authorized mark of certifying organization] (1/)

DATE OF CERTIFICATION [mm/yy (as a minimum) ] (1/)

CARE INSTRUCTIONS

- a. Machine wash hot. NO BLEACH.
- b. Wash separately from flammable, lint-producing fabrics.
- c. Rinse thoroughly. Soap or detergent residues will burn.
- d. DO NOT STARCH. Starch will burn.
- e. Tumble dry medium. Remove garment promptly.

DO NOT REMOVE THIS LABEL (2/)

1/ The manufacturer shall insert the applicable information.

2/ When a split label is used, this legend shall appear as the bottom line of both labels."

3.2.7.1.1 Split combination label. It shall be optional to split the combination label information onto two separate labels providing both labels have 'DO NOT REMOVE THIS LABEL' as the bottom line. When the label is split, the second label shall be sewn to the inside of the front right facing in a location and construction corresponding to the front left facing label (see manufacturing operation 10).

3.2.7.2 Woven size label. The woven size label shall finish a minimum of 1 inch wide and shall be long enough to allow a 3/8 inch seam allowance at each end. The label shall be white, the lettering shall be black. The letters shall be a minimum of 3/8 inch high and a minimum 3/16 inch wide. The size label shall consist of the letter designations as shown in paragraph 1.2 (i.e "M", "XL", "XXL-L", etc.). An option to use separate label with an "L" for the long sized shirts is acceptable provided it is placed to the immediate right of the size label. Fastness to laundering requirements of MTL-DTL-32075 shall apply.

3.3 Design. The shirt shall be a single-breasted design, button through front with a rolled collar and a straight cut bottom. It has two breast patch pockets with flaps. Fastener tape closures are used on the pocket flaps and sleeve cuffs.

3.4 Patterns. Standard full size patterns (MTDC-960) will be furnished by the Government. The standard patterns shall not be altered in any way and shall be used only as a guide for cutting the contractor's working patterns. The contractor's working patterns shall be identical to the standard patterns. The standard patterns provide an allowance of 3/8 inch for all joining seams, unless otherwise specified. (See 6.4)

3.4.1 List of pattern parts. The components of the shirt shall be cut from materials as specified in accordance with the pattern parts indicated below:

Material	Pattern nomenclature	Cut parts
Basic material	Front	2
	Back	1
	Sleeves	2
	Collar	2
	Breast pocket	2
	Breast pocket flap	2 or 4
	Sleeve tab	2
	Basic material or optional aramids	Collar interlining

### 3.5 Construction.

3.5.1 Stitches, seams and stitching. Stitch, seam, and stitching types, as specified in table III, shall conform to ASTM D 6193. When two or more seam or stitch types are given for the same part of an operation, any one of them may be used. Where stitch type 401 is used, the chain, or underside of the stitch, shall be on the inside of the shirt. Seam allowances shall be maintained with seams sewn so that no raw edges, runoffs, twists, pleats, puckers or open seams will result. All seams shall start and finish evenly. Thread tension shall be maintained so that there is no tight or loose stitching.

3.5.1.1 Safety and overedge stitching. The gage of safety stitching shall be 5/16 to 3/8 inch. The gage of overedge stitching and the overedge portion of safety stitching shall be 3/16 to 1/4 inch. The guides and knives for the safety stitch and overedge machines shall be set to trim only the ravelled edges of the fabric.

3.5.1.2 Thread breaks and ends of seams. Ends of all seams and stitching produced with 301 stitch type, when not caught in other seams or stitching, shall be backtacked not less than 1/2 inch. Thread breaks (all stitch types) shall be secured by stitching back of the break not less than 1/2 inch. Skipped stitches and thread breaks for 401 stitch type may be repaired using 301 stitch type. The ends of a continuous line of stitching (except labels and automatic stitching) shall be overlapped not less than 1/2 inch. The ends of labels and automatic stitching shall be overlapped not less than three stitches.

3.5.1.3 Stitches per inch. The minimum and maximum number of stitches per inch shall be as specified in table III.

3.5.2 Puckering. In the course of the sampling examination, seams suspected of being puckered shall be examined at a distance of 3 feet in comparison with the AATCC photographic comparative

5100-91G

rating (see 2.2) for seams. Puckering of 50 percent of the suspected seam that equals or is worse than class 3 for single needle seams shall be scored as a puckered seam.

3.5.3 Buttonholes. The buttonholes shall be the cut-after eyelet end taper bar type, worked over gimp with the end tacked with not less than four stitches not counting the cross-over stitch. The stitching shall be caught in the fabric with the purling on the outside. The finished cut length of the buttonholes shall be 3/4 to 7/8 inch.

3.5.4 Bartacks. Unless otherwise specified, bartacks shall be as follows, bartacking shall be free from thread breaks and loose stitching:

Length	Width	Tolerance		Stitches per Bartack
		Length	Width	
1/2 inch	1/8 inch	±1/16 inch	±1/32 inch	28

3.6 Manufacturing operations. The shirt shall be made in accordance with the manufacturing operation requirements specified in table III. The manufacturer is not required to follow the exact sequence of operations unless otherwise specified within table III.

3.6.1 Figures. Figures 1, 2, and 3 are furnished for information purposes only. In the event of inconsistencies between the specification and the figures, the specification shall govern.

3.6.2 Shade and size marking. The cut components of the shirt shall be marked or bundled to ensure a uniform shade and size throughout the garment. Any method of marking may be used except:

- a. Corrosive metal fastening devices.
- b. Sew-on type tickets.
- c. Adhesive type tickets that discolor the material or leave traces of paper or adhesive on material after ticket removal.

Table III. Manufacturing Operations Requirements

No.	Manufacturing Operation	Stitch type	Seam & Stitching type	Stitches Per inch	Thread Needle	Bobbin or Looper
1.	<p><u>Cutting</u></p> <p>a. Spread the material without tension.</p> <p>b. Cut the shirts in strict accordance with the patterns furnished which show size, shape, warp directional lines and placement of pockets, also notches for the proper assembly of all parts. If the edge of one facing is raw, cut, or frayed, both facings of the same shirt shall be overedged the entire length of the facing (see operation 14a).</p> <p>c. Cut all parts of the shirt from the same piece of the basic material except collar interlining (see 3.2.2), sleeve tabs, and breast pocket flap liner (see operation 6a, two piece method), which shall approximate the shade of the garment.</p> <p>d. Cut the stripping for sleeve tab of sufficient length to comply with operation 8. Stripping may be cut from ends and shall approximate the shade of the garment.</p> <p>e. Cut two pieces of pile tape and two pieces of hook tape, 1-1/2 ±1/8 inches long, for the breast pocket closure (operation 5b and 6c).</p> <p>f. Cut two pieces of pile tape 6 ±1/4 inches long for the sleeve operation (7b), and two pieces of hook tape 1-1/2 ±1/8 inches long for the sleeve tab operation (8b).</p>					
2.	<p><u>Replacement of Damaged Parts</u></p> <p>a. Re-cut, in process, any part containing damages such as a hole, smash, multiple float or slub.</p> <p>b. Replace any part damaged during the manufacturing process by needle chew, cut, tear, hole, or exposed drill hole.</p>					
3.	<p><u>Shade Marking (see 3.6.2)</u></p> <p>Mark, ticket, or bundle all parts of the shirt, except those cut from ends, to ensure a uniform shade and proper assembly throughout the garment.</p>					

## 5100-91G

Table III - Manufacturing operations Requirements (continued)

No.	Manufacturing Operation	Stitch type	Seam & Stitching type	Stitches Per inch	Needle	Thread Bobbin or Looper
4.	<u>Make Collar</u> Finished appearance. The collar and collar points shall be uniform in appearance, and the collar edges shall finish smooth and flat, without twisting, gathers, puckers, or raw edges.					
	a. Position interlining to under collar with points and edges even and quilt parallel to collar length using a 4 needle machine with needles set 1/2 inch apart.	301 or 401	SSv-4	10-14	35	35
	b. Seam collar pieces together along outside edges.	301 or 401	SSe-2(a)	10-14	35	35
	c. Trim corners, turn, work out edges and points, and edge 1/8 ±1/16 inch from turned edges.	301	SSe-2(b)	10-14	35	35
5.	<u>Make Breast Pockets</u> Finished appearance. The patch pockets shall be of uniform shape, squared, and lie flat and smooth without twist, puckers, or raw edges. The hem shall finish 1-7/8 ±1/4 inches wide.					
	a. Overedge stitch top edge of patch pocket. Turn under top as indicated by marks on pattern, and press, forming hem.	503 or 504	Efd-1	10-14	35	35
	b. Position the hook tape (operation 1e) to outside of each pocket, at the pattern marks, and sew on four sides, 1/16 to 1/8 inch from edge.	301	LSbj-1	7-12	50	50
	c. Pockets may be creased on a creasing machine.					
6.	<u>Make Pocket Flaps</u> Finished appearance. The flaps shall completely cover the pocket hem stitching, be uniform in shape, and finish flat and smooth.					
	a. (Option 1) Single part method: with face to inside fold flap in half, top to bottom, and stitch side edges	301 or 401	SSe-2(a)	10-14	35	35
	<u>OR</u>					
	a. (Option 2) Two part method: place flap and flap lining face to face and stitch side and bottom edges together.	301 or 401	SSe-2(a)	10-14	35	35
	Turn flap right side out, force out points and edges and edgestitch 1/8 ±1/16 inch from turned side and bottom edge.	301	SSe-2(a)	10-14	35	35
	b. Overedge stitch the top raw edge of flap.	503 or 504	SSa-1	10-14	35	35
	c. Position the pile tape (operation 1e) to the inside of each flap at the pattern marks and stitch on all four sides 1/16 to 1/8 inch from edge.	301	LSbj-1	7-12	50	50

## 5100-91G

Table III - Manufacturing operations Requirements (continued)

No.	Manufacturing Operation	Stitch type	Seam & Stitching type	Stitches Per inch	Needle	Thread Bobbin or Looper
7.	<u>Hem Sleeves</u>					
	a. Turn under the bottom raw edge of the sleeve 3/8 inch. Fold to inside to form a 1-1/2 ±1/4 inch hem. Stitch through the sleeve 1/8 ±1/16 inch from the edge.	301	EFb-1	10-14	35	35
	b. Join the pile tape (operation 1f) to the bottom of the sleeve at the pattern marks with a single row of stitching 1/16 to 1/8 inch from the edges, on all four sides	301	LSbj-1	7-12	50	50
8.	<u>Make Sleeve Tab</u>					
	Finished appearance. The tabs shall be uniform in shape and finish flat and smooth. Tab width shall finish 1-1/4 ±1/8 inch.					
	a. (Option 1) Fold in half lengthwise and stitch around the sides and one end, leaving one end open for turning.	301 or 401	SSe-2(a)	10-14	35	35
	Trim, turn out and work out points and edges and edge stitch with a single row of stitching 1/8 ±1/16 inch from folded edge.	301	SSe-2(b)	10-14	35	35
	<u>OR</u>					
	a. (Option 2) Fold in half, turn in ends and sides and stitch 1/8 ±1/16 inch from edge.	301	SSc-1	10-14	35	35
	b. Join the hook tape (operation 1f) to tab at the pattern marks (3/8 to 1/2 inch from end of tab). Stitch the tape on all four sides with a single row of stitching 1/16 to 1/8 inch from edge.	301	LSbj-1	7-12	50	50
9.	<u>Set Sleeve Tab to Sleeve</u>					
	The tab shall be located to align with pile tape on sleeve, ±3/16 inch, as shown in figure 2.	301 running track		6-10	35	35
10.	<u>Attach Combination Label</u>					
	Position the combination label on the inside of the front left facing (and front right facing when using a split label), 1 to 1-1/2 inches above the bottom hem, and sew on all four sides with a single row of stitching 1/16 to 1/8 inch from the edge. The stitching shall not be through the printing.	301	LSbj-1	7-12	35	35
11.	<u>Press Fronts</u>					
	Fold back front edge 2-1/4 to 3-1/4 inches to inside and press down flat.					
	NOTE: Pressing is optional.					

## 5100-91G

Table III - Manufacturing operations Requirements (continued)

No.	Manufacturing Operation	Stitch type	Seam & Stitching type	Stitches Per inch	Needle	Thread Bobbin or Looper
12.	<u>Set Pockets and Flaps</u>					
	a. Turn side and bottom raw edges and stitch pockets on fronts, as indicated by marks on patterns, $1/8 \pm 1/16$ inch from the edge. Alignment of pocket tops shall be within $1/4$ inch.	301	LSd-1	10-14	50	50
	b. Sew pencil division. Stitch through left pocket and front with a row of stitching parallel to and $1-1/2 \pm 1/8$ inches from the right edge of the left pocket, Start and end the stitching at the top and bottom edges of the pocket.	301	SSv-1	10-14	50	50
	c. Fold under and position top edge of pocket flap approximately $3/4$ inch above top edge of pocket, making sure pocket hem is completely covered by flap. Stitch across top of pocket flap with a single row of stitching, $1/8 \pm 1/16$ inch from edge.	301	LSd-1	10-14	50	50
	d. Bartack the left and right side of pocket openings and pencil division stitching using $1/2$ inch bartacks superimposed on the pocket stitching. Upper edge of bartacks shall be located at the upper edge of the pocket $\pm 1/16$ inch.	Bartack		28 per bartack	35	35
	e. Bartack flap at each corner with horizontal bartacks superimposed on the stitching. Bartacks shall be $1/2$ inch. Outside edge of bartacks shall be located at outside edges of flap $\pm 1/16$ inch.	Bartack		28 per bartack	35	35
13.	<u>Join Fronts to Backs</u>					
	Join fronts to backs at shoulder with safety stitch seam.	301 or 401	LSc-2 or SSA-2	10-14	50	50
14.	<u>Join Collar to Shirt</u>					
	a. Overedge stitch the selvaged edge of facing if selvage is cut or frayed (see operation 1b).	503 or 504	EFd-1	10-14	35	35
	b. Fold facing back at notch.					
	c. Insert collar between fronts at collar notch.					
	d. Stitch across step and gorge to a point $1-3/4$ to 2 inches from shoulder seam and notch collar through facing and fronts. Seam under collar to neck of shirt. Shoulder seams shall be turned toward back.	301	SSa-1	10-14	50	50
	e. Turn facing, work out steps. Insert top of facing inside collar, turn in the unsewn portion of the top collar and topstitch to neck $1/8 \pm 1/16$ inch from folded edge. Topstitching shall be superimposed on undercollar stitching $\pm 1/8$ inch.	301	LSb-1	10-14	50	50

## 5100-91G

Table III - Manufacturing operations Requirements (continued)

No.	Manufacturing Operation	Stitch type	Seam & Stitching type	Stitches Per inch	Needle	Thread Bobbin or Looper
	f. Center woven size label on center of collar to within 1/8 inch of collar seam. Sew label on all four sides with a single row of stitching 1/16 to 1/8 inch from edges. Insert optional Long (L) label to the immediate right of the size label. The printing shall be clearly visible. It shall be optional to catch the upper edge(s) of the woven size label(s) in the collar seam (see operation 14e)	301	LSbj-1	7-12	35	35
15.	<u>Set in Sleeves</u> Set sleeves to shirt by stitching with a safety stitch in one operation, matching notches on sleeve and front armhole.	301 or 401	LSc-2	10-14	50	50
16.	<u>Join Side Seams and Sleeve Seams</u> Join the sideseam and the underarm seam in one continuous operation with safety stitching, capturing sleeve tab in underarm seam.	301 or 401	LSc-2	10-14	50	50
17.	<u>Bartack Sleeves</u> Make four 1/2 inch bartacks, one centered on upper edge of each sleeve tab and one located on each sleeve end (see figure 2).	Bartack		28 per bartack	35	35
18.	<u>Hem Bottom</u> Turn raw edge of shirt under 3/8 inch. Fold to inside to form a 3/4 to 1-1/8 inch hem, single stitch 1/8 ±1/16 inch from folded edge, and continue stitching across the ends of hem 1/8 ±1/16 inch from edges. Hem shall not extend beyond front edges of shirt.	301	EFb-1 and SSa-1	10-14	35	35
19.	<u>Buttonholes</u> a. Mark position for buttonholes on left front as indicated by pattern. b. Make a horizontal buttonhole at each mark with the inside edge of eyelet 1/2 to 3/4 inch from front edge with ends tacked. Buttonholes shall be equally spaced.	Buttonhole		50-60 per buttonhole	35	35

5100-91G

Table III - Manufacturing operations Requirements (continued)

No.	Manufacturing Operation	Stitch type	Seam & Stitching type	Stitches Per inch	Needle	Thread Bobbin or Looper
20.	<p><u>Buttons</u> Finished appearance. The front buttons shall be positioned <math>3/4 \pm 1/8</math> inch in from the right edge (measured from center of button). Sew buttons on the outside of right front of shirt through front and facing to correspond with buttonholes in the left front.</p>	301		14-22 per button	50	50
21.	<p><u>Clean Shirts</u> Trim all loose ends of thread to less than 1/2 inch and remove loose threads. Remove all spots, stains, and visible shade markings.</p>					

3.7 Finished measurements. Finished measurements of shirts shall be as specified in table IV.

Table IV. Finished measurements (inches,  $\pm 1/2$  inch)

Size	1/2 chest (A) <u>1/</u>	Back length (B) <u>2/</u>	Sleeve length (C) <u>3/</u>
Extra Small	20	28-1/2	31
Small	22	29-1/2	32
Small-Long	22	31	33
Medium	24	30-1/2	33
Medium-Long	24	32	34
Large	26	31-1/2	34
Large-Long	26	33	35
Extra Large	28	32-1/2	35
Extra Large-Long	28	34	36
Extra Extra Large	30	33-1/2	36
Extra Extra Large-Long	30	35	37
Extra Extra Extra Large	32	34-1/2	37
Extra Extra Extra Large-Long	32	36	38
Extra Extra Extra Extra Large	34	35-1/2	38
Extra Extra Extra Extra Large-Long	34	37	39

NOTE: A, B, and C refer to figure 3. A, B, and C measurements shall be taken with the shirt buttoned and laid flat and smooth.

1/Chest measurement shall be taken with shirt buttoned, at a point in line with pit of armhole, from folded edge to folded edge.

2/Back length shall be taken along center of back from undercollar seam to bottom edge of shirt.

3/Sleeve length shall be taken from center back of shirt at undercollar seam diagonally across back and along sleeve to center of bottom edge of sleeve.

3.8 Deviations and waivers. Deviations and waivers to the materials or construction specified herein shall not be allowed unless authorized in writing by the administrative contracting officer.

3.9 Workmanship. The finished shirts shall conform to the quality of product established by this specification. The occurrence of nonconformities shall not exceed the applicable acceptable point values. The finished shirts shall conform to NFPA 1977 requirements for protective clothing.

3.10 Metric products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch/pound units, provided they fall within the tolerances specified using conversion tables contained in the latest revision of FED-STD-376, and all other requirements of this specification are met.

3.11 Recovered materials. The contractor is encouraged to use recovered material in accordance with Federal Acquisition Regulation 23.4 to the maximum extent practical.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his/her own or any other facilities suitable for performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for certification. An approved Certification Organization shall certify that the shirts meet the requirements of NFPA 1977. The contractor shall provide all required materials, garments, and information to the Certification Organization to permit such certification.

4.1.2 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of nonconforming material.

4.1.3 Responsibility for dimensional requirements. Unless otherwise specified in the contract or purchase order, the contractor is responsible for ensuring that all specified dimensions have been met. When dimensions cannot be examined on the end item, inspection shall be made at any point or at all points in the manufacturing process necessary to ensure compliance with all dimensional requirements.

4.1.4 Certification of compliance. Unless otherwise specified, certificates of compliance supplied by the manufacturer of the item, component, or material, listing the specified test method and test results obtained, may be furnished in lieu of actual lot by lot testing performed by the contractor (see 4.3.2). Where certificates of compliance are submitted, the Government reserves the right to check test such items to determine the validity of the certification.

4.2 Sampling for inspections and tests. Sampling for inspections and tests shall be made in accordance with ASQ Z1.4. The inspection level and acceptable quality level (AQL) shall be as specified.

4.3 Quality conformance inspection. Each end item lot shall be sampled and inspected as specified in 4.3.4.1 and 4.3.4.2. As part of quality conformance inspections, test results shall be submitted to determine compliance of the basic cloth with the requirements of Forest Service specification 5100-87. The packaging shall be sampled as specified in 4.4. Packaging is not required when first articles are presented. Unless otherwise specified (see 6.2), the first articles submitted in accordance with 3.1 shall be inspected as specified in 4.3.4.1 and 4.3.4.2. The presence of any nonconformity or failure to pass any test shall be cause for nonacceptance of a first article sample.

4.3.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents, drawings, and standards unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

4.3.2 Certification. As a part of the first article submission the contractor shall provide certificates of compliance (COC) for the materials of the shirts. COCs shall be provided for the following components:

- Basic material (3.2.1)
- Collar interlining (3.2.2)
- Thread (3.2.3)
- Gimp (3.2.4)
- Buttons (3.2.5)
- Hook and Pile fastener tape (3.2.6)
- Labels (3.2.7)

4.3.2.1 COC Contents. The COCs shall be supported by test reports on the component, these test reports shall also be submitted as a part of the first article submission. Test reports supplied by the manufacturer are acceptable. The COC shall include the following:

- Specification with type, class, etc.
- Quantity purchased
- Purchase source, address, and telephone number
- Purchase date

4.3.2.2 NFPA 1977. As a part of first article submission, the contractor shall provide copies of the third party certification to NFPA 1977, 2005 Revision.

4.3.3 In-process inspection. Inspection shall be made at any point or during any phase of the manufacturing process to determine whether cut and finished lengths, cut parts, marking for location of components, and location of assembled component parts are in accordance with specified requirements and the drawings. Whenever non-conformance is noted, corrections shall be made to the parts and lot affected in-process. Parts that cannot be corrected shall be removed from production.

4.3.4 Examination of the end item. Examination of the end items shall be in accordance with 4.3.4.1 and 4.3.4.2.

4.3.4.1 Visual examination. Each sample shirt selected from lots presented for delivery (see 4.3.4.1.1) shall be examined for nonconformities in color, design, material, construction, workmanship and marking and the nonconformities classified in accordance with table V as follows:

TABLE V. End item classification of visual nonconformities

<u>Nonconformity</u>	<u>Point value</u>
<u>Material Nonconformities and Workmanship Damages</u>	
a. Any hole, cut, tear, mend, burn, needle chew, exposed drill holes, or open place:	
1. Up to and including 1/4 inch	2
2. More than 1/4 inch	3
b. Slub larger than F <sup>1</sup> / <sub>1</sub> on any part of the shirt.	1
c. Knot larger than D <sup>1</sup> / <sub>1</sub> on any part of the shirt.	1
<p><u>NOTE:</u> Material nonconformities and workmanship damages are to be classified as indicated above only when the condition is one which definitely weakens the structure of the garment, or when it is so conspicuously located as to be clearly noticeable. Nonweakening conditions which are inconspicuous shall not be classified as nonconformities.</p>	
<u>Shaded Parts</u>	
a. Shaded parts (excluding sleeve tab, breast pocket flap liner, and collar interlining).	2
b. Any shade bar above the bottom buttonhole on the finished shirt.	1
c. Shade of sleeve tab or breast pocket flap liner not good approximation of the shade of the garment.	1
<u>Cleanness</u>	
a. Any spot or stain on outside.	1
b. Five or more thread ends not trimmed to 1/2 inch or less.	1
c. Two or more shade or size tickets not removed.	1
d. One or more shade or size markings visible on outside.	1
<u>Cutting</u>	
a. Any component part not cut in accordance with specified pattern or directional lines as indicated on patterns or not in accordance with specification requirements.	3
<u>Components and Assembly</u>	
a. Any component part or required operation omitted (unless otherwise classified herein).	3
b. Any operation not performed as specified (unless otherwise classified herein).	1
c. Any component not as specified (type, size, color, etc.).	3
d. The edge of any component part required to be forced out, having folds more than 1/8 inch (unless otherwise classified herein).	1
e. Any component part twisted, distorted, pleated, misshaped, tight, or full (unless otherwise classified herein).	2

---

<sup>1</sup>/ For these nonconformities use the Sears Fabric Defect Replica Scales (see 2.2).

TABLE V. End item classification of visual nonconformities (continued)

Nonconformity	Point value
<u>Seams and Stitching</u>	
a. General:	
1. Seam irregular, twisted, or wavy (unless otherwise classified herein).	1
2. Seam puckered (score only on major portion of seam) (see 3.5.2).	1
3. Any part of shirt caught in an unrelated operation or stitching.	2
4. End of stitching when not caught in other seams or stitching not backstitched as specified (except stitching for attaching labels and automatic stitching).	1
5. Thread break (all stitch types) stitched less than 1/2 inch beyond each end of break.	1
6. Ends of a continuous line of stitching not overlapped as specified.	1
7. Thread color not as specified.	1
8. Stitching for attaching labels or automatic stitching not finished as specified.	1
b. Gage of stitching and seam allowance:	
1. Gage irregular or not within range specified.	1
2. Edge or raised stitching sewn too close to edge, resulting in damage of cloth.	2
3. Seam allowance more than 1/16 inch more or less than specified.	1
c. Open seams:	
1. On all seams except bottom hem and label stitching:	
(a) Up to 1/2 inch (inclusive).	1
(b) More than 1/2 inch up to 3/4 inch (inclusive)	2
(c) More than 3/4 inch	3
2. On bottom hem more than 1/2 inch.	1
3. On label stitching.	1
 <u>NOTE:</u> One or more broken, skipped, or runoff stitches on a joining seam constitutes an open seam.	
d. Runoffs:	
1. On joining seam score as open seam.	
2. Edge or raised stitching (when not resulting in an open seam);	
(a) Up to 1/2 inch (inclusive)	1
(b) More than 1/2 inch	2
e. Raw edges:	
 <u>NOTE:</u> Raw edge not caught in stitching shall be classified as an open seam (unless otherwise specified).	
f. Seam and stitch type:	
1. Seam or stitch type not as specified.	2
2. Looper thread on outside.	3
3. Any required line of stitching omitted.	3
4. Any line of stitching not beginning or ending where specified (unless otherwise classified herein).	1
5. Any seam not lapped or finished as specified.	1

TABLE V. End item classification of visual nonconformities (continued)

Nonconformity	Point value
g. Broken, missing, or skipped stitches on edge or raised stitching (when seam is seamed, turned, and stitched) more than 1/4 inch.	1
h. Stitch tension:	
1. Loose tension, resulting in a loose seam.	3
2. Loose tension on edge or raised stitching, resulting in exposed loose thread.	1
3. Tight tension (stitches break when strain is applied in direction of seam or stitching).	3
 <u>NOTE:</u> Puckering is evidence of tight tension. When puckering is evident, seam shall be tested by exerting pull in lengthwise direction of seam or stitching. If broken stitching results from the pull, score as specified above.	
i. Stitches per inch:	
1. Stitches per inch to be scored only when the condition exists on more than half the length of seam or stitching:	
(a) Less than the minimum specified.	2
(b) More than maximum specified.	1
 <u>Buttonholes</u>	
a. Omitted, misplaced, added, not specified type, or not finished as specified.	3
b. Gimp omitted, uncut buttonhole, or ends of gimp not pulled through to underside.	1
c. Ragged edge, incomplete stitching, stitching not securely caught in fabric.	2
d. One or more broken stitches or two or more skipped stitches in one or more buttonholes.	1
e. Buttonhole stitching extending beyond bartack; stitches per buttonhole less than minimum specified. (2/)	1
f. Finished cut length not as specified.	1
g. Gimp color not a good approximation of the color of the basic material.	1
h. End of button hole tacked with less than four stitches.	1
 <u>Buttons (applying to all buttons)</u>	
a. Missing, broken, defective (3/), misplaced, not positioned, or attached as specified, or insecurely sewn.	2
b. Wrong type, size, or color.	3
c. Badly shaded.	1
d. Stitching on one or more not locked at end of cycle (tug at the loose end of the thread when accessible to determine if it will ravel).	1

2/ Stitches per buttonhole shall be determined by counting the number of needle perforations containing stitch floats to the outside of the buttonhole gimp.

3/ A button shall be considered nonconforming when it has sharp, rough, cracked, or split edge; has scratch, dent, blemish, or imbedded air bubble(s) or foreign matter; or is badly shaded.

TABLE V. End item classification of visual nonconformities (continued)

<u>Nonconformity</u>	<u>Point value</u>
<u>Fastener Tapes</u>	
a. Hook and pile tapes not positioned as specified, exceeding 1/8 inch tolerance.	1
b. Length and width not as specified.	1
c. Incorrect color.	1
<u>Bartacks</u>	
a. One missing, loose, or misplaced; not specified size or not serving intended purpose.	1
b. Two missing, loose, or misplaced; not specified size or not serving intended purpose.	2
c. Three or more missing, loose, or misplaced; not specified size or not serving intended purpose.	3
d. Loose stitch tension.	1
<u>Labels</u>	
a. Woven size label(s):	
1. Label missing, incorrect, or illegible.	3
2. Label not located under collar seam as specified.	1
3. Label off center by more than 1/2 inch.	1
4. Stitching through the printing of label.	1
b. Combination label:	
1. Missing, incorrect, or illegible.	3
2. Stitching exposed on outside of shirt.	1
3. Not positioned as specified.	1
4. Stitching through the printing.	1
<u>Collar</u>	
a. Not uniform in size or shape--any point varying more than 3/8 inch with corresponding point or matching part.	3
b. Collar points uneven in length by 3/8 inch or more.	2
c. Twisted, not smooth, too full, short, or tight, causing collar to turn out.	2
d. Collar points not properly forced out.	2
e. Off center by 1/2 inch or more. ( <u>4/</u> )	1
f. Tight at joining to neck, causing puckers or pleats at neckline (see 3.5.2).	1
g. Edge of collar not properly forced out, i.e., having a fold of more than 1/8 inch.	1
h. Stitching of topcollar joining seam more than 1/8 inch above or below stitching of undercollar joining seam for a distance of more than 2 inches.	1
i. Parallel rows of stitching on undercollar omitted.	3
j. Stitch gage of parallel rows of stitching varying from the gage specified by more than 1/8 inch.	1

---

4/ Center of collar is determined by aligning the two shoulder seams at junction of collar.

TABLE V. End item classification of visual nonconformities (continued)

<u>Nonconformity</u>	<u>Point value</u>
<u>Fronts</u>	
a. Spacing between two or more buttonholes unequal by 1/4 inch or more.	1
b. Buttonhole position:	
1. Buttonhole less than 5/8 inch or more than 7/8 inch from edge.	1
2. Two or more buttonholes out of horizontal alignment by more than 1/4 inch.	1
3. Lapel buttonhole not parallel with top edge of lapel.	1
c. Front tight or short, or front facing tight or twisted causing noticeable bulge or twist when shirt is buttoned.	1
d. Front edge not folded straight with warp line (i.e., forming curve).	1
e. Length of fronts:	
1. Uneven by 1/2 inch or more at bottom, when buttoned.	1
2. Uneven by 1/2 inch or more at neck, when buttoned.	1
<u>Front Facing</u>	
a. Facing not caught as specified.	1
b. Back edge of facing not finished as specified (see table III, operation 1b.).	1
c. Width of facing not as specified.	1
d. Facing not smooth and flat, shows evidence of puckering.	1
<u>Pocket or Flap</u>	
a. Not uniform in size or shape - any measurement varying from pocket to pocket or flap to flap by:	
1. More than 3/8 inch.	3
2. 1/4 inch up to and including 3/8 inch.	2
b. Out of alignment at any point from pocket to pocket or flap to flap by: (Determination may be made by a straight edge)	
1. More than 1/2 inch.	3
2. More than 3/8 inch up to and including 1/2 inch.	1
<u>Pocket</u>	
a. Pocket edge(s) not parallel to front edge of shirt by:	
1. More than 3/8 inch.	3
2. More than 1/4 inch up to and including 3/8 inch.	2
3. 3/16 inch up to and including 1/4 inch.	1
b. Edge of pocket pleated or twisted.	1
c. Pocket corner not secured as specified.	1
d. Width of pocket hem not as specified.	1
e. Pocket hem not overedged.	1
f. Pocket opening gapped.	1

TABLE V. End item classification of visual nonconformities (continued)

<u>Nonconformity</u>	<u>Point value</u>
<u>Flap</u>	
a. Attached crookedly:	
1. Distance between sides of pocket and underside of opened flap vary by more than 1/8 inch.	2
b. Pocket exposed beyond end of flap by 1/8 inch or more.	1
c. Not properly forced out.	1
d. Underside of flap not finished as specified.	1
e. Edge of under flap exposed beyond edge of top flap 1/16 inch or more for a distance of 1 inch or more.	1
f. Side edge(s) of flap extending beyond side edge(s) of pocket by more than 1/4 inch.	1
<u>Sleeves</u>	
a. Sleeves reversed.	3
b. Sleeves pleated or excessive fullness at armhole, affecting appearance (see 3.5.2).	2
c. Sleeve tight at armhole seam causing puckers on front or back, affecting appearance (see 3.5.2).	2
d. Sleeve hem (bottom of sleeve) finishing less than 1-1/4 inch or more than 1-3/4 inch wide.	1
e. Sleeve hem irregular in width by 1/4 inch or more.	1
f. Sleeve tab not finished flat and smooth.	1
g. Tab not positioned as specified or attached crookedly.	1
h. Tab width less than 1-1/8 inch or more than 1-3/8 inch.	1
<u>Bottom Hem</u>	
a. Less than 3/4 inch or more than 1-1/8 inch wide.	1
b. Irregular in width by 1/4 inch or more.	1
c. Hem end extending more than 1/8 inch beyond front edge of shirt.	1
d. Hem twisted, pleated, or puckered (see 3.5.2).	1

4.3.4.1.1 Acceptable point values. The sample size based on lot size and the acceptance values for 3 and 2 point nonconformities and total (3, 2, and 1 point) nonconformities listed in 4.3.4.1 shall be as specified in table VI. The sample unit shall be one shirt and the lot shall be unacceptable if either or both of the following occur:

a. The point value for 3 and 2 point nonconformities exceeds the applicable maximum acceptable point value.

b. The point value for total (3, 2, and 1 point) nonconformities exceeds the applicable maximum acceptable point value.

Table VI. Sampling provisions for visual examination

	Lot size	Sample size	Maximum acceptable point values	
			3 & 2 point nonconformities (1/)	3, 2, & 1 point nonconformities
Normal Inspection	Up to 500	50	18 points	25 points
	501 to 1,200	80	25 points	36 points
	1,201 to 3,200	125	32 points	50 points
	3,201 to 10,000	200	45 points	73 points
	10,001 and over	315	68 points	110 points
Tightened Inspection	Up to 500	50	13 points	20 points
	501 to 1,200	80	20 points	30 points
	1,201 to 3,200	125	32 points	40 points
	3,201 to 10,000	200	45 points	58 points
	10,001 and over	315	68 points	88 points
Reduced Inspection	Up to 1,200	32	13-20 points	25 points
	1,201 to 3,200	50	16-25 points	32 points
	3,201 to 10,000	80	23-32 points	43 points
	10,001 and over	125	32-41 points	54 points

1/ For reduced inspection, when the first value is exceeded but not the second value, the lot shall be accepted, but normal inspection shall be reinstated (see 4.3.4.1.4.4). The second value is the maximum acceptable point value.

4.3.4.1.2 Initiation of inspection. Normal inspection shall be used at the start of inspection unless otherwise directed by the responsible procurement quality assurance element administering the contract.

4.3.4.1.3 Continuation of inspection. Normal, tightened, or reduced inspection shall continue unchanged on successive lots except where switching procedures in 4.3.4.1.4 require change.

#### 4.3.4.1.4 Switching procedures

4.3.4.1.4.1 Normal to tightened. When normal inspection is in effect, tightened inspection shall be instituted when two out of five consecutive lots have not been accepted on original inspection (i.e., ignoring resubmitted lots for this procedure).

4.3.4.1.4.2 Tightened to normal. When tightened inspection is in effect, normal inspection shall be instituted when five consecutive lots have been considered acceptable on original inspection.

4.3.4.1.4.3 Normal to reduced. When normal inspection is in effect, reduced inspection shall be instituted, providing that all of the following conditions are satisfied:

a. The preceding 10 lots have been on normal inspection and none have not been accepted on original inspection; and

b. The total number of points for 3 and 2 point nonconformities in the samples from the preceding 10 lots is equal to or less than 60 percent of the total maximum acceptable point values for 3 and 2 point nonconformities from the preceding 10 lots; and

c. The total number of points for 3, 2 and 1 point nonconformities in the sample from the preceding 10 lots is equal to or less than 75 percent of the total maximum acceptable point values for 3, 2 and 1 point nonconformities from the preceding 10 lots; and

d. Production is at a steady rate; and

e. Reduced inspection is considered desirable by the procurement quality assurance element administering the contract.

4.3.4.1.4.4 Reduced to normal. When reduced inspection is in effect, normal inspection shall be instituted if any of the following occur on original inspection:

a. A lot is not accepted; or

b. A lot is considered acceptable but exceeds the applicable first value (see 4.3.4.1.1); or

c. Production becomes irregular or delayed; or

d. Other conditions warrant that normal inspection be instituted.

4.3.4.2 Dimensional examination. The appropriate number of shirts, determined from table VII below, shall be examined for conformance to the dimensional requirements cited in table IV. When a measurement deviates from a dimension and tolerance specified, the shirt shall be penalized 1 point. Each shirt shall also be penalized 1 point when the sleeves are uneven in length by 1/2 inch or more. The lot shall be unacceptable if the total point value resulting from this examination exceeds the maximum acceptable point value. Each size of shirt present in the lot should be represented in the sample selected for this examination.

Table VII. Sampling provisions for dimensional examination

Lot size	Sample Size	Maximum acceptable point values
Up through 500	8	0
50 - 3,200	13	1
3,201 - 35,000	20	2
35,001 and up	32	3

4.4 Packaging inspection. An examination shall be made to determine that preservation, packing, and marking comply with the section 5 requirements. Nonconformities shall be scored in accordance with the list below. The sample unit shall be one shipping container fully packaged with the exception that it need not be closed. Examination of closure nonconformities listed below shall be made on shipping containers fully packaged. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 and the AQL, expressed in terms of nonconformities per hundred units, shall be 2.5.

<u>Examine</u>	<u>Nonconformity</u>
Markings	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application.
Materials	Any component missing or not as specified. Any component damaged, affecting serviceability.
Workmanship	Inadequate application of components, such as: incomplete closure of container flaps, improper taping, loose strapping, inadequate stapling. Bulged or distorted container.
Contents	Number per container is more or less than required.

## 5. PACKAGING

5.1 Preservation. Preservation shall be in accordance with ASTM D 3951 and as specified in the contract or purchase order (see 6.2).

5.1.1 Packaging. Each fully buttoned shirt shall be neatly folded to measure approximately 14-1/2 inches by 10-1/2 inches. The folded shirt shall be secured with stainless steel pins, aluminum clips, or plastic fasteners. Each shirt shall be inserted in a snug-fitting flat style clear polyethylene film bag of 0.00125 inch thickness ( $\pm 25$  percent tolerance). The polyethylene bag shall be formed with heat-sealed seams that are straight, continuous, and parallel to each other and the formed edges of the bag. The final closure of the bag shall be heat sealed with the heat seal made as close as possible to the open end. The bag may be fabricated from polyethylene film tubing or sheeting. A 1/4 inch diameter hole shall be made at one corner of each polyethylene bag to allow excess air to escape. As an alternate, the polyethylene bag may be of the tuck-in or reverse flap type in which case a heat seal closure and corner vent hole are not required.

5.2 Packing. Unless otherwise specified (see 6.2), packing shall be in accordance with the requirements specified herein.

5.2.1 Packing. Fifty shirts of one size, packaged in accordance with 5.1.1 and folded widthwise, shall be stacked in two rows of 25 each into a close-fitting fiberboard box. The box shall comply with the Uniform Freight Classification and the National Motor Freight Classification. Boxes shall be type CF, variety SW, class Domestic, grade 350 of ASTM D 5118; the closure shall be in accordance with method IV of the appendix. The box size shall be 20-1/2 x 15 x 17-1/2 inches.

5.2.1.1 Packing of larger sizes. When the 50 of the larger size shirts do not fit in the specified box, the contractor shall coordinate with GSA the packaging of fewer shirts per box.

5.3 Marking. In addition to any special marking required by the contract or purchase order, shipping containers shall be marked in accordance with FED-STD-123.

5.3.1 Polyethylene bag. Each polyethylene bag (see 5.1.1) shall have the stock number, nomenclature, and size legibly printed or stamped in black on the center face of the bag, or a label printed black on white with the required information shall be inserted in the bag so that it can be easily read through the polyethylene.

## 6. NOTES

6.1 Intended use. The shirts are intended to be worn with flame-resistant jeans for fighting wildland fires and for conducting controlled burning operations.

6.2 Acquisition requirements. Acquisition documents must specify:

- a. Title, number, and date of this specification.
- b. Sizes of shirts and quantities of each (see 1.2).
- c. When required, the specific issue of individual document referenced (see 2.1 and 2.2).
- d. When first article samples are not required (see 3.1, 4.3, and 6.3).
- e. When lot by lot testing is required in lieu of certificates of compliance (see 4.3.2).
- f. Packaging requirements if other than specified (see 5.1 and 5.2).

6.3 First article. When first articles are required, they shall be inspected and approved under the appropriate provisions of FAR 52.209. First articles shall be preproduction samples. The contracting officer should include specific instructions in all acquisition documents regarding arrangements for selection, inspection, and approval of the first articles.

6.4 Bidder information. For bidding purposes, 11" X 17" drawings will be furnished upon request. They will contain sufficient information regarding size, shape, and quantity of material for bidding purposes. It is the bidder's responsibility to determine yield and waste from the provided 11" X 17" drawings and no further direction or clarification will be provided by the government. Color shade samples, full-size drawings and full-size patterns will be furnished only to successful bidders upon contract award.

6.5 Notice. When Government drawings, specifications, or other data are used for any other purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever.

6.6 Preparing Activity. USDA Forest Service, Missoula Technology and Development Center (MTDC), 5785 Highway 10 West, Missoula, Montana 59808.

5100-91G

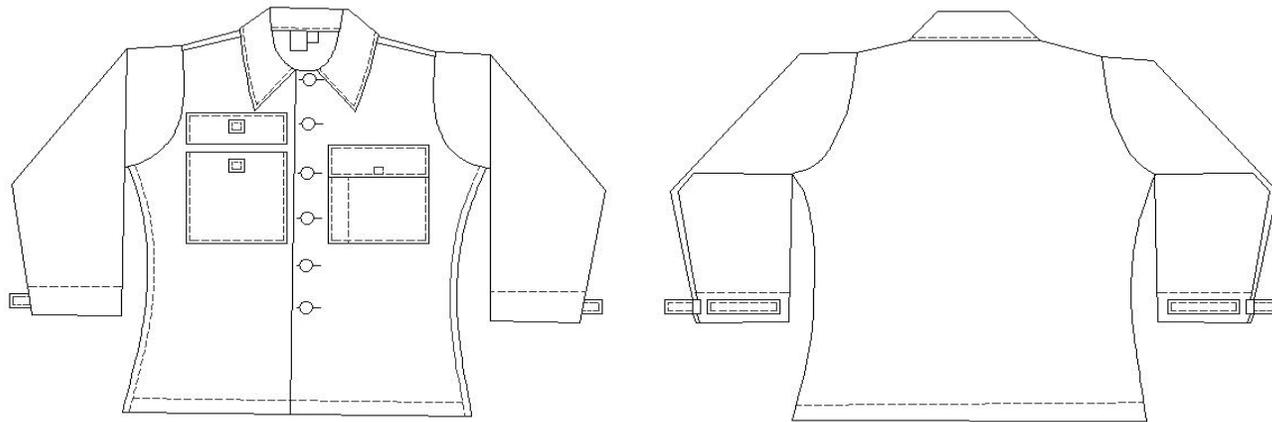


FIGURE 1 -- SHIRT, FLAME -- RESISTANT ARAMID

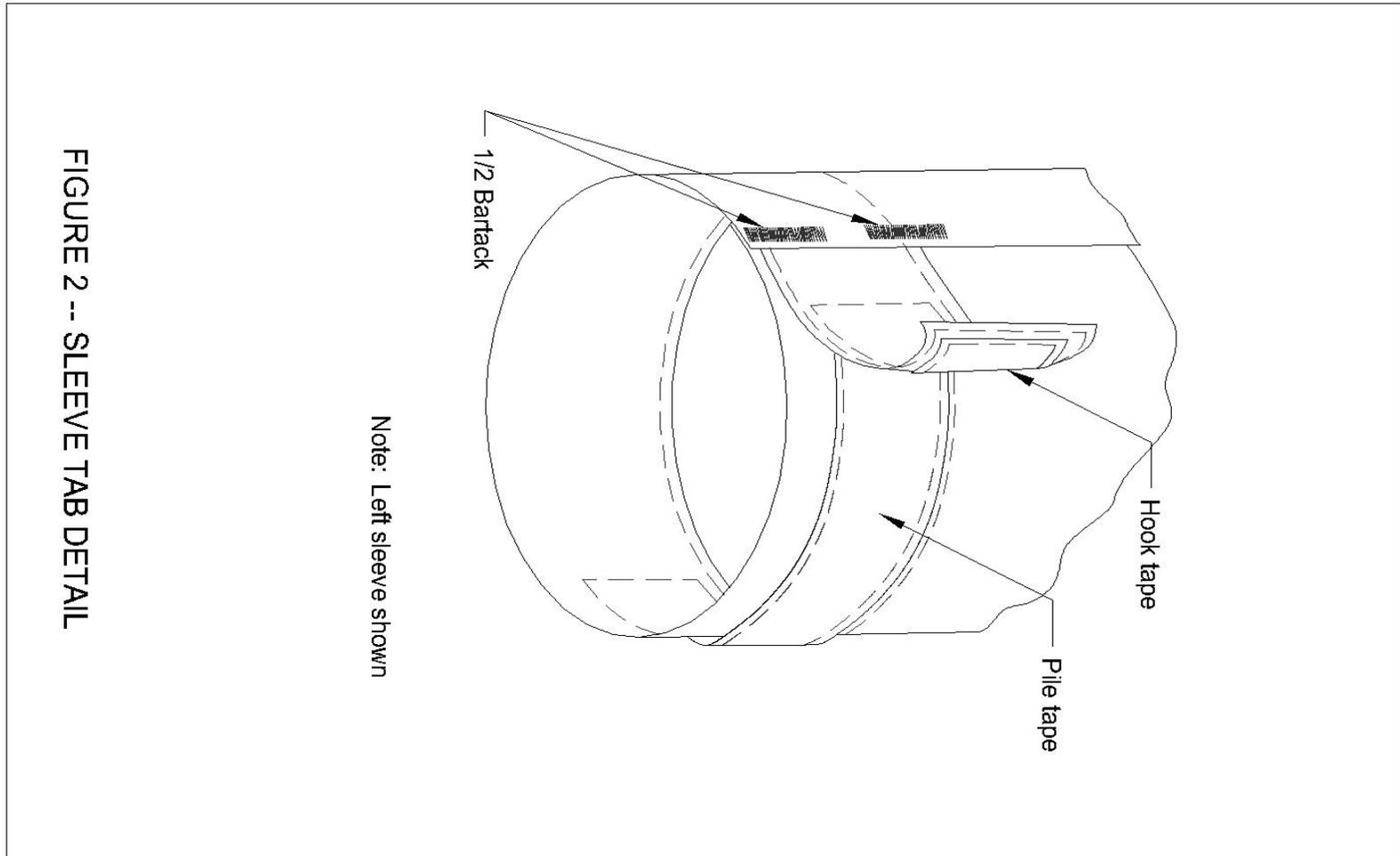
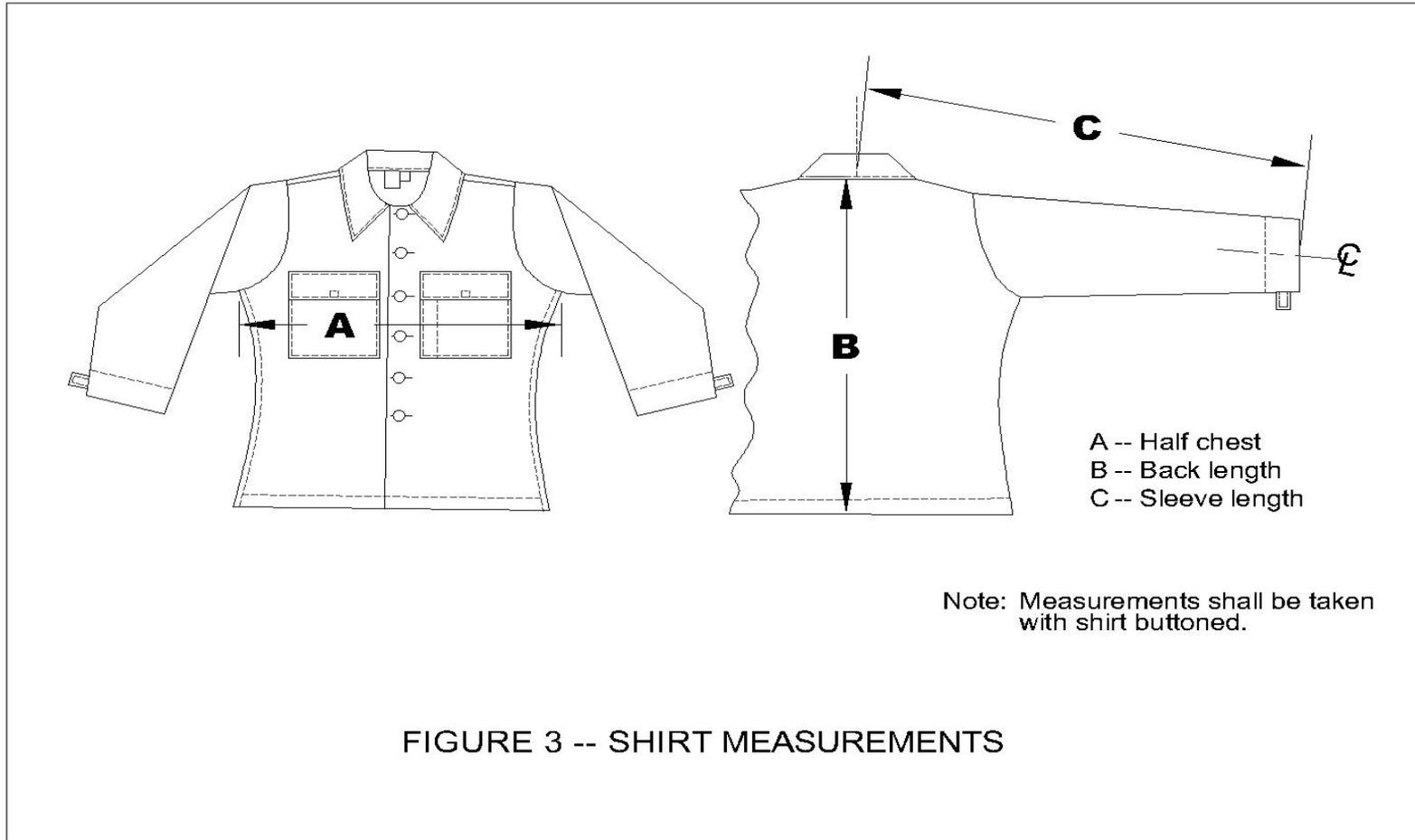


FIGURE 2 -- SLEEVE TAB DETAIL



# Standardization Document Improvement Proposal

This form is provided to solicit beneficial comments that may improve this document and enhance its use. Contractors, government activities, manufacturers, vendors, and users are invited to submit comments to:

USDA Forest Service  
Missoula Technology and Development Center  
5785 Highway 10 West  
Missoula, MT 59808

Attach any additional pertinent information that may be of use in improving this document to this form and mail in an envelope. A response will be provided when the submitter includes their name and address.

NOTE: This form shall not be used to submit requests for waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the document, or to amend contractual requirements.

Document Identification: **5100-91G - Shirt, Flame-Resistant Aramid**

Submitter's Name (Optional. Please print or type):

Submitter's Organization and Address:

\_\_\_\_\_

Vendor    User    Manufacturer \_\_\_\_\_

Phone Number: \_\_\_\_\_

Date: \_\_\_\_\_

Has any part of the Document created problems or required interpretation in procurement use?

Is any part of the Document too rigid, restrictive, loose, or ambiguous? Please explain below:

Give paragraph number and wording: \_\_\_\_\_

\_\_\_\_\_

Recommended change(s): \_\_\_\_\_

\_\_\_\_\_

Reason for recommended change(s): \_\_\_\_\_

\_\_\_\_\_

Remarks:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Fold

Attach  
stamp

USDA Forest Service  
Missoula Technology and Development Center  
5785 Highway 10 West  
Missoula, MT 59808

Fold and staple for mailing